

Components of a Nutrient Management Plan in Minnesota



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Purpose

A good nutrient management plan helps producers manage the location, rate, timing, form, and method of all nutrient applications. It is a tool to increase net returns and protect natural resources. The purpose of this publication is to present the components of nutrient management plans required under the state feedlot rules and those required for participation in some USDA Natural Resources Conservation Service (NRCS) incentive and cost-share programs. Although nutrient management plans are not required of all farms, they are recommended as integral to good farm management.

Plans required by state feedlot rules, administered by the Minnesota Pollution Control Agency (MPCA), are referred to as manure management plans (MMP) and may differ slightly from nutrient management plans (NMP) developed for USDA programs, such as the Environmental Quality Incentives Program (EQIP).

This publication lists nutrient management plan components common to both NMPs and MMPs (shown in **BLACK**) and additional plan components specific to NMPs (shown in **GREEN**).

NOTE: Not listed in this publication are additional plan components required for federal NPDES feedlot permits (≥ 1000 animal units) and for Comprehensive Nutrient Management Plans required for NRCS cost-shared manure or waste storage structures.

Contents

This publication separates nutrient management plan components into:

1. Baseline Plan Components
 - ◆ Field Maps
 - ◆ Soil Survey Maps
 - ◆ Production Sequence or Crop Rotation
 - ◆ Livestock and Manure Information
 - ◆ Soil and Water Conservation Practices
 - ◆ Sensitive Areas Identification and Management
 - ◆ Operation and Maintenance Information
2. Annual Plan Components
 - ◆ Crop-Year Field Maps
 - ◆ Planned Nutrient Applications
 - ◆ Crop Nutrient Budgets
3. Record-Keeping Components
 - ◆ Field-Specific Records
 - ◆ Farm-Specific Records

Baseline Plan Components

Baseline plans provide most information required by MPCA, much information needed to develop annual plans, and operation and maintenance tips needed to implement the annual plan. Baseline plan components generally do not change, and the plan itself is only updated as necessary.

Field Maps

Maps should include or identify:

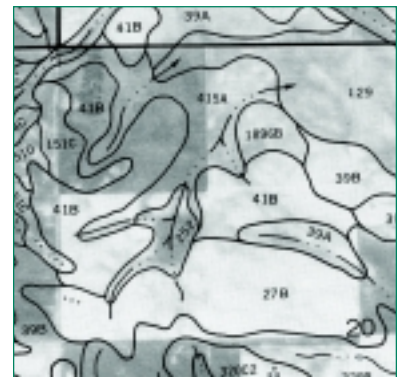
- ◆ map scale
- ◆ feedlot location relative to field locations
- ◆ field name(s) and/or field number(s)
- ◆ areas receiving or suitable to receive manure applications
- ◆ areas to receive wintertime manure applications sometime during the rotation
- ◆ reference points including north arrows, roads, legal description to quarter section
- ◆ sensitive areas where nutrient applications must be carefully managed
- ◆ fields with slopes greater than 6% if soil survey maps are not included

A variety of maps can be used (hand-drawn, digital, photographic). Maps should be updated when fields or field boundaries change.



Soil Survey Maps

Soil survey maps identify the soil types within a field. Information such as soil texture is important when evaluating potential environmental impacts of nutrient applications. Soil survey maps are available from NRCS and Soil and Water Conservation District (SWCD) offices.



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Production Sequence or Crop Rotation

Planned full-crop sequences for all fields should be listed. (MPCA requires, at a minimum, crop sequence information sufficient to calculate legume nutrient credits.)

Livestock and Manure Information

The plan should describe livestock and manure information needed to develop manure application recommendations. Updates will be necessary when there are changes in livestock numbers or in manure storage, handling, or application practices. Livestock information includes:

- ◆ livestock size, type, and number annually
- ◆ manure storage and handling system
 - storage type, capacity, duration of storage, number of times facility is emptied or partially emptied annually (include normal month(s) in which facility is emptied)
 - manure application methods and timing of incorporation
 - work-hours needed to apply the manure
- ◆ manure
 - volume of manure produced annually and during shorter periods of manure storage
 - annual amount of nitrogen, phosphorus and potassium from manure that will be land-applied and acres needed for those applications

Soil and Water Conservation Practices

The plan should include soil and water conservation practices that have been or will be implemented to reduce erosion and runoff potential on fields receiving manure applications.

Sensitive Area Identification and Management

Sensitive areas are areas where the potential for degradation of natural resources, including water quality, is increased. Understanding and accounting for these factors is important when developing a plan. Information on identifying and managing for sensitive features can be found in the publication *Applying Manure in Sensitive Areas*, available at NRCS and county feedlot offices, or online at <http://www.pca.state.mn.us>.

- ◆ Identification of Sensitive Areas
The plan should identify:
 - lakes, streams, protected wetlands, intermittent streams, unbermed ditches, grassed waterways and road ditches
 - water supply wells, mines and quarries, sinkholes, open tile intakes
 - vulnerable drinking water supply management areas, 100-year floodplains (MPCA requirement), frequently flooded soils, high water table soils
 - soils with shallow fractured bedrock, coarse textured soils, areas with uncontrolled ephemeral erosion

Many of these features can be shown on the baseline and annual field maps, on soil maps, or on maps that specifically address sensitive features.

◆ **Field Risk Assessment**

The plan should include:

- a field-specific assessment of potential phosphorus transport from the field when animal manure or other organic by-products are applied
- a field-specific assessment of potential off-field nitrogen movement when fields are located in 1) vulnerable drinking water supply management areas, 2) areas with identified nitrate water quality impairments or 3) areas with high or very high pollution sensitivity of the water table or shallow aquifers as portrayed in a County Geologic Atlas or Regional Hydrologic Assessment

Consult local NRCS and SWCD field offices for assistance with field nitrogen and phosphorus risk assessments.

◆ **Sensitive Area Management**

The plan should recommend protective measures for the identified sensitive areas. These measures should be re-evaluated when cropping or manure and fertilizer practices change. Protective measures include:

- restrictions on manure application rates or application methods
- planting a cover crop after applying manure in the summer to harvested fields
- (MPCA requires a specific list of practices on fields receiving wintertime manure applications)

Operation and Maintenance Information

Operation and maintenance information should include:

- ◆ **manure and soil sampling practices**
 - methods, frequency
 - name of laboratory performing analysis (laboratory must be approved by the Minnesota Department of Agriculture)
- ◆ **equipment calibration practices and equipment maintenance information**
- ◆ **safety information**
 - fertilizer and fertilizer container transportation, storage, and disposal information
 - information on preventing exposure to manure gases, organic wastes, and some chemical fertilizers



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Annual Plan Components

Information used to develop crop-year-specific nutrient management plans must be updated annually. The information should be saved for at least six years.

Crop-Year Field Maps

These maps identify crop year, fields receiving manure and **fertilizer applications**, fields receiving wintertime manure applications, crops to be grown on the field, field acres and sensitive areas. They should be clearly labeled; the producer, the commercial applicators, and the plan reviewers should use the same name or number to identify each field.

Planned Nutrient Applications

The annual plan includes a schedule of manure and commercial fertilizer nutrient applications specifying:

- ◆ planned nutrient **form** (**fertilizer**, manure, etc.)
- ◆ planned per-acre annual **rates** per form (Total N, P_2O_5 and K_2O to be applied)
- ◆ planned manure and **commercial fertilizer application timing** (fall, spring preplant, at planting, sidedress, etc.) **and frequency** (if **applied more than once per crop year**)
- ◆ planned manure and **commercial fertilizer application method**, including hours or days between application and incorporation



Annual plans will take into consideration the sensitive areas and sensitive area management practices described in the baseline plan.

Crop Nutrient Budgets

Field-specific crop nutrient budgets are used to determine nutrient application recommendations. Crop nutrient budgets include:

- ◆ planned crop and crops planted in the preceding two years, including yield goals and actual yields
- ◆ soil types and soil and manure test analyses (**Plant tissue test results, if applicable**)
- ◆ crop needs for nitrogen (N), phosphorus (as phosphate, P_2O_5) **and potassium (as potash, K_2O)** based on University of Minnesota fertilizer recommendations
- ◆ available nutrients for the crop from previous legume crops and manure applications
- ◆ amount of N, P_2O_5 and K_2O available to plants at prescribed commercial fertilizer and manure application rates.

Record-Keeping Components

A thorough, continuous record-keeping system will help you develop realistic yield goals, monitor results of past decisions, and make new plans.

Field-Specific Records

- ◆ soil nutrient test analysis
- ◆ locations and cropland acreage where manure is applied
- ◆ analysis and volume or tonnage of manure applied on a per-acre basis (MPCA also requires total amount of manure applied to all sites)
- ◆ expected amounts of plant-available nitrogen, phosphorus, and **potassium** from manure and commercial fertilizer applications on a per-acre basis
- ◆ dates of manure application and days to manure incorporation after application (**NRCS calls this method, timing, and placement.**)
- ◆ commercial fertilizer analysis and application rate, **method, timing, and placement**
- ◆ name and address of commercial hauler or applicator receiving manure (required by MPCA)
- ◆ **planting and harvest dates and yields (at least 5 years of yield information is needed to determine realistic yield goals)**



Farm-Specific Records

- ◆ manure test analysis
- ◆ **quantity of manure and other organic by-products produced during the planning period**
- ◆ quantity of manure transported off-site to land not owned or controlled (including location of site, field acreage, and per-acre application rate)
- ◆ name and address of commercial hauler or applicator who transported the manure off-site
- ◆ **quantity and dates of manure removed from the system due to feeding, energy production, or export from the operation**
- ◆ **quantity of manure transported off-site to be used as something other than a crop nutrient**

NOTE: MPCA requires fewer records than shown for operations with fewer than 300 animal units. MPCA also requires records of changes made to the initial Manure Management Plan (e.g., if the timing of a manure application differs from the original plan).

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Resources

- ◆ <http://www.mn.nrcs.usda.gov/ecs/nutrient/nutrient.html>
USDA NRCS Minnesota Nutrient Management Web site.
- ◆ <http://www.pca.state.mn.us/publications/wq-f8-07.pdf>
Minnesota Pollution Control Agency Manure Management Plan Requirements
- ◆ <http://www.mda.state.mn.us/appd/ace/nutmgmt.htm>
Minnesota Department of Agriculture Nutrient Management Web site. Includes descriptions of MDA nutrient management programs and provides contact information.
- ◆ <http://www.extension.umn.edu>
University of Minnesota Extension Service Web site. Contains information and publications on nutrient and manure management.
- ◆ <http://gaia.bae.umn.edu/extens/manure/landapp/index.html>
Manure and Odor Education and Research at the University of Minnesota Extension Service. Includes links to MPCA rules.

Other sources of information on requirements for nutrient management plans include your local NRCS office and your county feedlot office.



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